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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,121	06/27/2003	Setsuyuki Takeuchi	AK-T-420XX	6700

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EXAMINER	
EWALD, MARIA VERONICA	
ART UNIT	**PAPER NUMBER**
1722	

DATE MAILED: 09/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,121	TAKEUCHI ET AL.	
	Examiner	Art Unit	
	Maria Veronica D. Ewald	1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hume, et al. (U.S. 5,492,467) in view of Swenson, et al. (U.S. 5,885,628) and further in view of Kofsman, et al. (U.S. 5,804,228).

Hume, et al. teaches an injection molding system, which includes an article formation cavity and a melt transport mechanism. In the referenced molding system, the article formation cavity is curved and at its outer edge is bordered by a gate which opens and closes to allow or deter the movement of the melt material from the injection mechanism to the cavity itself (column 9, lines 55 – 56, item 16 – figure 1, item 66 – figure 3A). This reads on a cavity mold, as described by the applicant, which has a gate of a sprue of a cavity in a concave formed in a bottom thereof, a peripheral portion of the gate being formed into a flat face. Furthermore, the melt transport means is comprised of a main nozzle body, formed of steel, that is substantially cylindrical (column 10, lines 5 – 6). This reads on the applicant's claim that the nozzle body be made of steel. There are first and second counterbores within the bushing body which surround a passageway for the melt material (column 10, lines 7 – 8). This reads on a

nozzle body having an opening formed in the end face of the nozzle. Hume, et al. further teaches that the nozzle ends in a flat face and the bushing body abuts the gate, which leads to the curved cavity mold (column 9, line 55, items 26 and 68 – figure 4). This reads on a nozzle having an end face formed into a flat face, the mold being arranged on the cavity mold such that the nozzle is inserted into the concave.

Hume, et al., however, do not teach the use of a cylindrical tip formed of metal having a lower thermal conductivity than the nozzle body nor teaches that the tip is axially slidably fitted into the nozzle housing.

In a method for injecting melt material into a cavity using an injection molding system, Swenson, et al. teach an injecting molding nozzle, which is comprised of a main body and a nozzle piece. Melt flows through the bore within the nozzle, which ends in the nozzle piece. The nozzle piece is constructed of two pieces, an inner piece and an outer piece. The outer piece is formed of a low thermally conductive material such as titanium alloy (column 4, line 41 – 44). This reads on the applicant's claim that the nozzle tip be formed of titanium alloy having a lower thermal conductivity than the steel used for the mold body. The use of the titanium minimizes heat transfer from the inner nozzle piece and the nozzle body to the cooled mold (column 4, line 44). The nozzle piece ends in a flat end face, which extends towards the surface of the mold and abuts the gate of the cavity (column 2, line 67, column 3, line 1, column 4, lines 33 – 34, item 22 – figure 1). Furthermore, the reference teaches that the nozzle piece sits on a shoulder of the nozzle body (column 4, line 28). This reads on the applicant's claim that the nozzle include a nozzle body having an opening formed in the end face of the

nozzle, a short cylindrical tip with a flat end face and a nozzle orifice in the center of the end face.

In another method for injecting melt material into a cavity using an injection molding system, Kofsman, et al. teach the use of an injecting nozzle assembly which is comprised of a nozzle housing and a nozzle tip section (column 5, lines 18 – 19). The nozzle tip section is freely slidably received in the nozzle housing, so that the nozzle tip section is able to slide within the lower portion during the injection molding process (item 60 – figure 2; column 5, lines 55 – 58). Furthermore, the nozzle tip section abuts the injection gate (item 128 – figure 2). This reads on the Applicant's claim that the nozzle tip be slidably fitted in the opening formed in the end face of the nozzle in such a way that its end face is protruded from the end face of the nozzle and directly touches the gate of the sprue of the cavity. Kofsman, et al. further teaches that because of the configuration of the nozzle tip, any thermal expansion of the nozzle housing is not imparted to the nozzle tip section (column 5, lines 58 – 59). This non-fixed construction enables the nozzle tip to remain in the ideal position during the molding operation and therefore, minimizes the formation of undesirable pieces in the molded components (column 5, lines 60 – 64). During operation, the force of the hydraulic pressure in the nozzle assembly maintains the nozzle tip section in its forward-position, substantially flush with the injection gate (column 7, lines 20 – 21, 45 – 47). This automatic control of the nozzle tip position eliminates the need to manually position the nozzle tip and the nozzle assembly itself allows it to be used with various resins without having the replace the nozzle tip section (column 8, lines 7 – 9).

It would have been obvious at the time of the invention to one of ordinary skill in the art to modify the injection system of Hume, et al. to incorporate the nozzle piece of Swenson, et al. to further incorporate the sliding nozzle tip of Kofsman, et al. for the purposes of 1) having a nozzle body and nozzle tip be formed from dissimilar metals of steel and titanium alloy, respectively, for the purpose of reducing heat transfer from the nozzle body to the cooled mold as taught by Swenson, et al. (column 4, lines 43 – 44) and 2) having a nozzle tip that is freely slidably received in the nozzle housing to ensure that the nozzle tip is not impacted by any thermal expansion of the nozzle housing, to allow automatic positioning of the nozzle tip such that the force of the flowing resin causes it to remain flush with the gate during the injection molding operation, and to minimize the formation of unwanted pieces of thermoplastic in the molded components as taught by Kofsman, et al. (column 5, lines 58 – 64; column 7, lines 20 – 21).

Claims 2 and 4 are rejected over Hume, et al. in view of Swenson, et al. further in view of Kofsman, et al. and further in view of Ciccone. Hume, et al., Swenson, et al., and Kofsman, et al. teach the characteristics described previously, but do not teach a nozzle tip with an inner peripheral wall face being formed in a conical face having the same angle as the conical end portion of a needle mounted in the nozzle and being fitted on the end portion of the needle.

In a method for injecting melt material into a cavity mold using a hot runner mold, Ciccone teaches the use of a nozzle insert that is in the form of a direct sprue nozzle tip with a central passage that communicates with the central bore inlet portion (column 2,

lines 55 – 56). The nozzle insert tapers conically to mirror the conical end portion of a needle mounted in the nozzle (item 34, 38 – figure 3).

It would have been obvious at the time of the invention to one of ordinary skill in the art to modify the injection system of Hume, et al., Swenson, et al., and Kofsman, et al. such that the nozzle piece tapers conically to mirror the angle of the needle mounted in the nozzle tip for the purpose of ensuring that the tip surface is kept small to avoid heat loss as taught by Ciccone, et al. (column 1, line 27).

Response to Arguments

14. Applicant's arguments with respect to claims 1 – 4 have been considered but are moot in view of the new ground(s) of rejection. Applicant argues, in the response filed on 29 July 2005, that the combination of references previously cited by the Examiner fails to teach that the nozzle tip be slidably fitted in the nozzle housing such that its end face is protruded from the end face of the nozzle and directly touches the gate of the sprue of the cavity. Applicant further argues that this feature is important because the nozzle-touching position can be maintained and thereby, minimizes resin leakage. Though Swenson, et al. teach a threaded nozzle tip as cited by the Applicant, Hume, et al. teach a nozzle tip (item 36 – figure 4) that remains in counterbore 42 (item 42 – figure 4) but is not shown threaded. However, in light of Applicant's argument, Examiner has cited Kofsman, et al. (U.S. 5,804,228). In an injection molding apparatus, Kofsman, et al. teach a nozzle tip (item 60 – figure 2) that is slidably received in the nozzle housing (column 5, lines 55 – 56). Kofsman, et al. further teach that: 1) this feature

minimizes the formation of unwanted vestiges in the molded product, 2) allows the nozzle tip to slide forward and remain flush with the gate (item 128 – figure 2) during operation of the apparatus due to the hydraulic pressure of the flowing resin and 3) allows automatic positioning of the nozzle tip regardless of the resin used or operational temperature of the resin without having to manually replace the nozzle tip each time (column 5, lines 60 – 61; column 7, lines 20 – 21; column 8, lines 7 – 9). Careful consideration has been given to Applicant's arguments; however, Examiner believes the combination of the references cited addresses the claim limitations noted.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Veronica D. Ewald whose telephone number is 571-272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MVE

Joseph S Del Sole
8/30/05
Joseph S. Del Sole